AMENDMENTS TO THE DRAWINGS

The attached Replacement Sheet includes changes to Fig. 5. This sheet, which includes Figs. 4-6, replaces the original sheet including Figs. 4-6.

Attachment: Replacement Sheet

Annotated Sheet Showing Change

REMARKS

This Amendment is responsive to the July 23, 2009 Office Action. Claims 1, 2, 5 and 7 have been amended and claim 4 has been cancelled. Fig. 5 has also been amended. Support for the claim amendments may be found, for example, in originally-filed claim 4; Fig. 3; and in the specification at pages 4 and 5, paragraphs [39] and [40]. Support for the amendment to Fig. 5 may be found, for example, in the specification at page 6, paragraph [52]. Claims 1-3 and 5-9 are now pending in this application.

Objection to the Drawings

The drawings are objected to for failing to show "an outer retention vessel having at least one coolant hole formed in a side or bottom thereof" as specified in claim 2. Fig. 5 has been amended to show a coolant hole (21a) in the bottom of the outer retention vessel. Reconsideration and withdrawal of this objection is respectfully requested.

Rejection Under 35 U.S.C. § 112, first paragraph

Claims 2, 3, 5 and 6 stand rejected under 35 U.S.C. § 112, first paragraph, for lack of enablement. Page 3 of the Office Action states "[t]here is neither an adequate description nor enabling disclosure as to how and in what manner the system can satisfactorily operate under core melt conditions with ONLY ONE coolant hole" (emphasis in original). Further, the Examiner contends that a single coolant hole will become blocked by debris during accident conditions.

However, the molten core material retention tank of claims 2, 3, 5 and 6 comprises an outer retention vessel, a porous protections vessel formed at an inside of the outer retentions vessel and a gravel layer formed between the outer retention vessel and the porous protection vessel. This porous protection vessel and the gravel layer are formed to have a porous structure. The cooling water/inert gas mixture can be provided through the whole area of the gravel layer and the porous protection vessel. Thus, molten core material or debris from the molten core material cannot come into contact with the outer retention vessel due to the porous protection vessel and the gravel layer. In other words, even if just one coolant hole is formed on the outer retention vessel, the coolant hole of the outer retention vessel is not blocked by molten core material or debris from the molten core material.

Further, pages 3 and 4 of the Office Action states "having only one coolant hole will not meet the redundancy and diversity requirements of the U.S. Nuclear Regulatory Commission for fluid systems important to safety…". Applicants respectfully submit that the Examiner's mere speculation of whether the claimed invention would meet the safety requirements of the U.S. Nuclear Regulatory Commission is not relevant to the issue of enablement. In particular, whether the claimed invention meets certain safety regulations of a government agency is not relevant in determining enablement, i.e., whether one skilled in the art can make or use the claimed invention.

Reconsideration and withdrawal of this rejection are respectfully requested.

Rejections Under 35 U.S.C. § 112, second paragraph

Claims 1-9 stand rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. The Examiner asserts that claim 1 is unclear in whether it is directed to the subcombination of a "cooling and retaining apparatus" or the combination of the "cooling and retaining apparatus" with a "reactor cavity." Claim 1 has been amended to recite "a molten core material retention tank configured to be installed inside a reactor cavity to retain molten core material from the reactor vessel" to clarify that the reactor cavity is not being positively claimed.

With regard to claims 1 and 7, the Examiner asserts that the term "high-pressure" is a relative term rendering the claims indefinite. Claims 1 and 7 have been amended to generally recite "inert gas under pressure" and "gas under pressure," respectively, to remove the relative terminology.

Reconsideration and withdrawal of these rejections are respectfully requested.

Rejections Under 35 U.S.C. § 103

Claim 1 is rejected under 35 U.S.C. § 103(a) for obviousness over either one of U.S. Patent No. 5,309,489 to Tate et al. (hereinafter "Tate") alone or U.S. H91 to Gabor et al. (hereinafter "Gabor") alone or U.S. Patent No. 6,658,077 to Alsmeyer et al. (hereinafter "Alsmeyer") in view of Gabor. Claims 2, 3-5 and 7 stand rejected under 35 U.S.C. § 103(a) for obviousness over either one of Gabor alone or the combination of Alsmeyer and Gabor. Claims 6 stands rejected under 35 U.S.C. § 103(a) for obviousness over the combination of Alsmeyer and Gabor. Claims 8 and 9 stand rejected under 35 U.S.C. § 103(a) for

obviousness over Tate. In view of the foregoing amendments and the following comments, reconsideration of these rejections are respectfully requested.

Amended independent claim 1 recites, *inter alia*:

> ...a molten core material retention tank configured to be installed inside a reactor cavity to retain molten core material from the reactor vessel; a compressed gas tank having an outlet valve at an outlet thereof and supplying inert gas under pressure; a cooling water storage tank being installed higher than the molten core material retention tank, having an outlet valve at an outlet thereof, and supplying cooling water; and a mixer including piping connecting to and extending from each of the compressed gas tank and the cooling water storage tank, the piping from the compressed gas tank and the piping from the cooling water storage tank being connected, thereby mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank and supplying the cooling water/inert gas mixture to the molten core material retention tank.

The cited references, whether considered individually or in combination, fail to teach or suggest a compressed gas supplying inert gas under pressure and a mixer including piping connecting to and extending from each of the compressed gas tank and the cooling water storage tank, where the piping from the compressed gas tank and the piping from the cooling water storage tank are connected thereby mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank and supplying the cooling water/inert gas mixture to the molten core material retention tank as recited in independent claim 1.

With regard to Tate, the Examiner asserts that the accumulation tank (20) discloses a compressed gas tank and that using an inert gas in the accumulation tank (20) would have been obvious to one of ordinary skill in the art. Further, the Examiner asserts that inert gas from the accumulation tank (20) will flow through piping (24), through a break in the pressure vessel and mix with the cooling water. Supplying inert gas to the accumulator tank (20) of Tate is used to increase the internal pressure of the accumulator tank (20). This is also the case with the apparatus of United States Patent No. 3,984,282 to Kleimola, which is relied upon by the Examiner to teach the use of an inert gas with an accumulator at page 6 of the Office Action. The Kleimola patent does not disclose that inert gas is supplied form the compressed gas tank and mixed with coolant. When internal pressure of the accumulator tank (20) of Tate is increased by the inert gas, the accumulator tank (20) can supply coolant to the pressure vessel (2). However, Tate does not disclose that inert gas is supplied from the

accumulator tank (20) and also fails to disclose that coolant is mixed with inert gas and mixture of coolant and inert gas being supplied to the accumulator tank (20). Therefore, Tate fails to teach or suggest a mixer including piping connecting to and extending from each of a compressed gas tank and a cooling water storage tank, where the piping from the compressed gas tank and the piping from the cooling water storage tank are connected thereby mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank as in the claimed invention.

With regard to Gabor, the Examiner asserts that space (36a) between the reactor and guard vessels (14a, 34a) or the space (37) between the reactor vessel and containment structure (14, 28) being maintained under inert gas atmosphere to detect leaks (see column 4, lines 4-11) discloses the compressed gas tank of claimed invention. The use of inert gas in Gabor, however, is for detecting leaking in the reactor vessel (14) due to mechanical trouble. That is, in the apparatus of Gabor, mechanical trouble may be detected by detecting leakage of inert gas. However, Gabor fails to disclose coolant mixed with inert gas and a mixture of coolant and inert gas being supplied into the steel liner (32). Therefore, Gabor fails to teach or suggest a mixer including piping connecting to and extending from each of a compressed gas tank and a cooling water storage tank, where the piping from the compressed gas tank and the piping from the cooling water storage tank are connected thereby mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank as in the claimed invention.

With respect to the combination of Alsmeyer and Gabor, the Examiner asserts that the apparatus of Alsmeyer discloses all of the limitations of claim 1 except for the compressed gas tank for supplying high-pressure inert gas. The Examiner contends that modifying the apparatus of Alsmeyer to provide inert gas inside the containment for leak detection as taught by Gabor would have been obvious to one of ordinary skill in the art. With respect to Alsmeyer, coolant is provided from the coolant reservoir (9) to the porous body (3) for cooling a core melt dropped on the sacrificial material (6). However, the apparatus of Alsmeyer uses only coolant and does not use inert gas. Alsmeyer fails to disclose that coolant is mixed with inert gas provided from a compressed gas tank and supplied to the porous body (3). As discussed above, the use of inert gas in Gabor for detecting leaking in the reactor vessel (14) due to mechanical trouble fails to disclose coolant mixed with inert gas and a mixture of coolant and inert gas being supplied to the retention

tank. Accordingly, modifying Alsmeyer to provide an inert gas atmosphere inside the containment, fails to teach or suggest a mixer including piping connecting to and extending from each of a compressed gas tank and a cooling water storage tank with the piping from the compressed gas tank and the piping from the cooling water storage tank being connected to mix the inert gas and the cooling water as in the claimed invention.

Furthermore, Applicants respectfully submit that the apparatus for passively cooling and retaining molten core material from a reactor, as defined by independent claim 1, is not merely an obvious matter of design choice. As discussed on page 8, paragraph [74], for example, the present invention can passively supply the cooling water/inert gas mixture during the primary cooling process to greatly reduce steam explosion, which may be caused by the rapid reaction between the high-temperature molten core material and the cooling water. Further, the decay heat of the molten core material may be effectively removed by passively recycling the condensed water. As discussed above, the cited references fail to disclose, expressly or inherently, a mixer including piping connecting to and extending from each of the compressed gas tank and the cooling water storage tank, where the piping from the compressed gas tank and the piping from the cooling water storage tank are connected thereby mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank and supplying the cooling water/inert gas mixture to the molten core material retention tank as recited in independent claim 1.

Therefore, for at least the foregoing reasons, the cited references fail to render independent claim 1 obvious. Reconsideration and withdrawal of this rejection are respectfully requested.

Claims 2, 3 and 5-9 depend from and add further limitations to independent claim 1 and are deemed to be in condition for allowance for all the reasons discussed above with respect to independent claim 1.

CONCLUSION

In view of the foregoing amendments and comments, Applicants respectfully request reconsideration of the objections and rejections and allowance of pending claims 1-3 and 5-9.

Respectfully submitted,

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ANNOTATED SHEET

Fig. 4

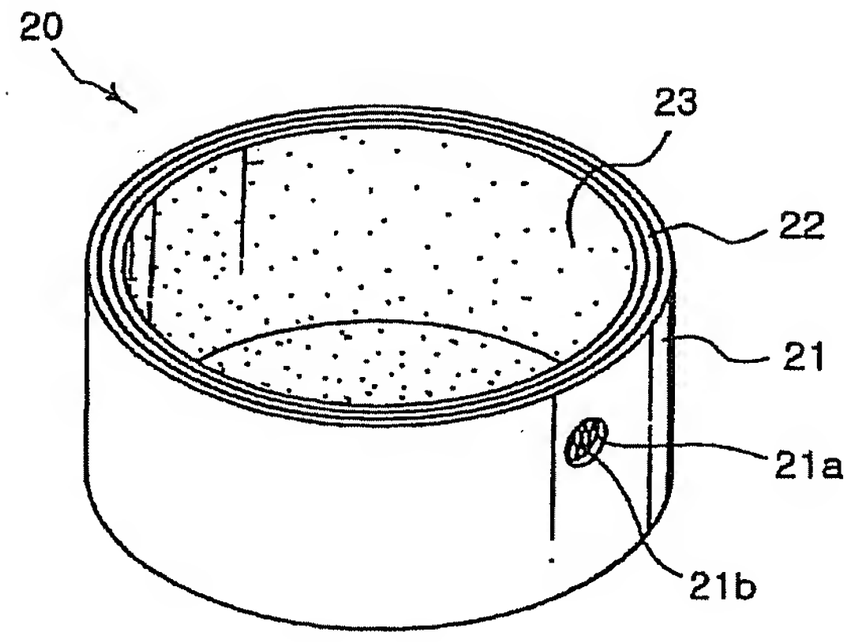
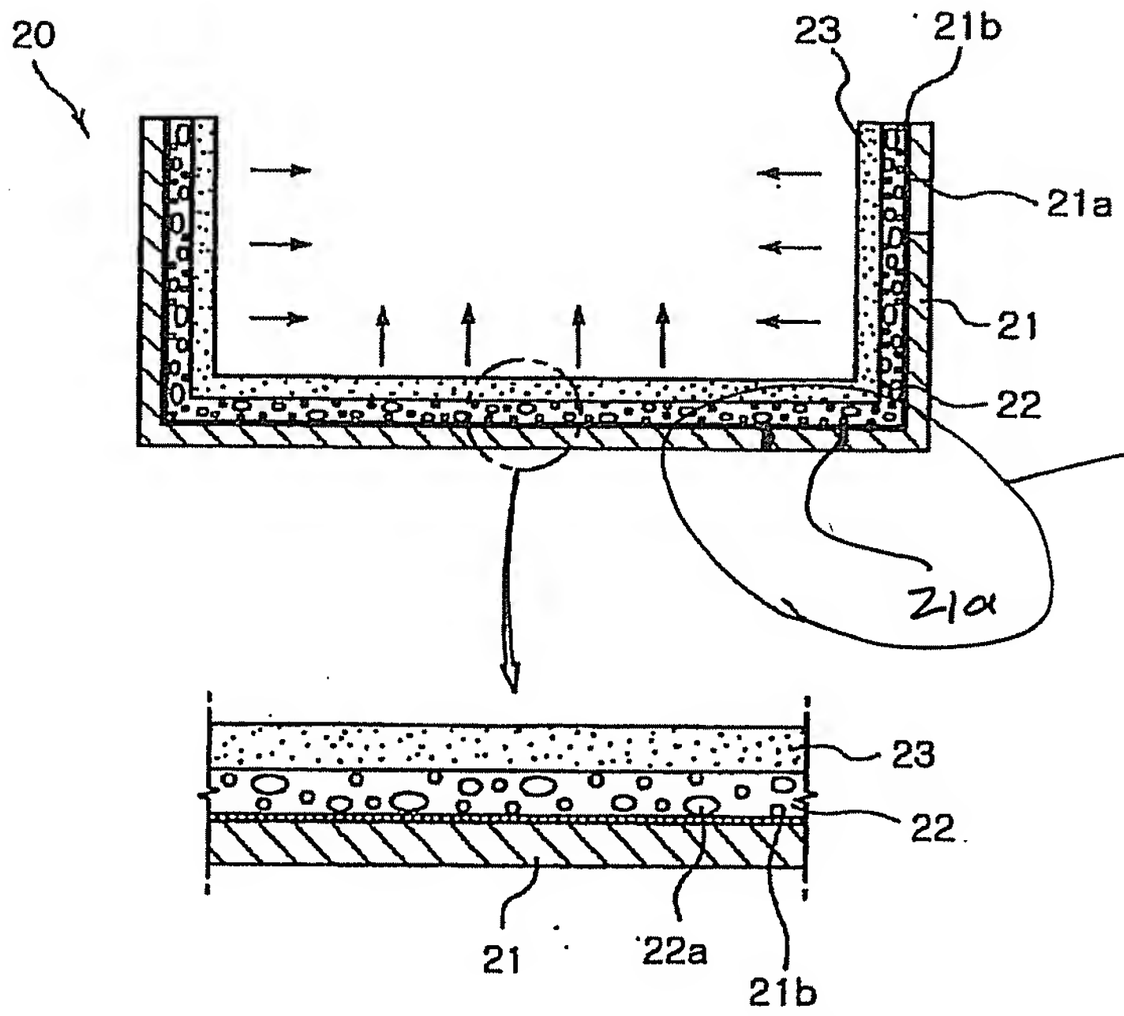


Fig. 5



Added coolant hole 21a in bottom surface

Fig. 6